EAT RESPONSIBLY : FOOD AND THE ENVIRONMENT

Today, more than half of all companies say they are committed to sustainable development, but it is becoming increasingly clear that reconciling environmental and economic performance involves many difficult choices. **Only 21% of companies have a clear roadmap for implementing their sustainability strategies.** At **AFYREN**, we believe that sharing knowledge and experience can contribute to a **more sustainable future**. In our articles, we seek to share the expertise we develop on our own journey toward a **sustainable, circular business model.**

In this overall objective, agriculture and the food industry have important roles, not only because they have to fulfill one of our basic needs, but also because their environmental footprints are meaningful. Globally, we use around **70% of freshwater withdrawal for agriculture** and **food is responsible for about more than a quarter of global greenhouse gas emissions.**

This is the third and final article in a series that takes a deep dive into the complex problems we need to overcome in these sectors by humbly presenting what we are trying to achieve at AFYREN. You can consult the other articles on waste and food quality here :

Feeding the world with a circular model : no waste, more again
Naturality in the ingredients

Reinventing the global food system to preserve our environment

Efforts are underway to transform a climate culprit into an example for industry

Could changing our eating habits help us conserve the planet?

It is a good place to start, but the long-term goal should be to **remake the global agriculture** and **food system** so that it **preserves land** and **the environment, safeguards biodiversity** and **contributes to good health for humans and animals alike**.

In an effort to head in this direction, the European Union has launched "**From Farm to Fork**", a pioneering strategy designed to create a «**fair, healthy, and environmentally conscious food system**.»

Objectives of the Farm to Fork program

- **Sustainable agriculture:** encouraging the adoption of sustainable farming practices, reducing fertilizer and pesticide use, and promoting organic farming.
- **Healthy and sustainable diets:** promoting healthier eating habits, including increased consumption of fruits, vegetables, and plant-based proteins.

To reach these objectives, the EU will favor a **global transition to agroecology** and promote **circular business models** in food processing, with a strong emphasis on making **use of food waste**.

The European Commission wrote in a **report**:

> *The circular bio-based economy is still a largely untapped potential for farmers and their cooperatives.*
>
> *For example, advanced bio-refineries that produce bio-fertilizers, protein feed, bioenergy, and bio-chemicals offer opportunities for the transition to a climate-neutral European economy and the creation of new jobs in primary production.*

The hope is that initiatives like this will stop the agriculture and food industries from sawing through the branch they are sitting on. The food system is globally responsible for a **31% of greenhouse gas emissions** and is **the primary driver of biodiversity loss**.

- **Transparent information:** Improving traceability and transparency in the food chain by providing consumers with accurate information about food products.
- **Climate action:** Promoting climate-friendly food production systems, reducing emissions from agriculture, and increasing the use of renewable energy.
- **Biodiversity conservation:** Preserving resources, protecting ecosystems, and promoting biodiversity through organic farming and preservation of habitats.
- **Food waste reduction:** Taking steps to **reduce food waste** and losses along the entire food supply chain.

Food system suffers consequences of its own making

Over the past 70 years, what was essentially a local activity has morphed into a global industry tasked with **catering to a rapidly growing population** who increasingly share globalized tastes. Faced with the complex logistics of transporting, storing, and distributing millions of tons of food products, **the magnified pressures on the environment** and **climate** have become immediately apparent.

Agriculture now depletes half of our habitable lands, primarily for grazing and feed production, and stands as **the largest consumer of water**.

Meanwhile, **climate change is impacting food production**, with a steady drumbeat of bad news affecting farmers.

Spain was forced to increase grain and cereal imports because of droughts in 2023. In 2022, India's promise to increase grain exports to make up for a steep drop in Ukrainian deliveries was scuttled after a **massive heatwave** wilted much of the Indian crop.

The EU is pushing for a **50% reduction in the use of chemical pesticides**, a **20% decrease in fertilizer use**, and at least a **25% share of the EU's agricultural land dedicated to organic farming** by 2030.

While fertilizers and chemical pesticides have resulted in higher yields over the decades, a consensus is emerging that using too many chemicals poses too great a risk to health and the environment.

Chemical fertilizers are also a business liability, as their price is firmly tied to that of fossil resources (gas and petrol). **The price of fertilizer tripled in 2021**, contributing to a rise in food prices.

And the Ellen MacArthur Foundation has developed a program called "**The big food redesign challenge**" where upcycled ingredients are key to reducing the impact of agriculture.

PUTTING A CIRCULAR APPROACH INTO PRACTICE

AFYREN is one of the companies in the vanguard of the transition the EU is eager to foster. Our business model is based on an **advanced circular bioeconomy approach**, with **several levels of circularity**, involving resource efficiency, resource renewability, recycling, and local procurement.

AFYREN provides proof that these models can work. Using **byproducts** from the sugar beet industry as feedstock, the company employs **biomimetic fermentation technology** to create **seven biobased organic acids** that are identical to those produced using petrol-based feedstock.

The only co-product left over from this production is provided to produce a **potassium-rich fertilizer** suitable for organic agriculture and that is proven to be a good nutritive support for potatoes, tomatoes and beet root crops.

AFYREN is committed to **helping reduce greenhouse emissions**, as the food system is in the **top five of the greatest emitters among all sectors**. We have engineered every stage of production to limit the production of CO_2.

Using renewable feedstocks instead of fossil resources **helps capture CO_2** and **reduces the amount of CO_2 in the atmosphere**. The first AFYREN factory site, in Eastern France near sugar beet farms and factories, was selected because of its **proximity to the raw materials** and suppliers in a radius of 300km. **AFYREN** has also **optimized the energy consumption of its fermentation technology**. Combined, these choices mean **our organic acids have a carbon footprint 5 times lower than petro-based equivalents**, which translates to saving the equivalent of 30,000 tons of CO_2 annually.

GREEN CHEMISTRY FOR BIODIVERSITY

Agriculture is suffering from another crisis it helped create: **biodiversity loss**.

AFYREN's low-carbon ingredients are **tools in the fight against biodiversity loss**. For example, our **AFYBIO™ Propionic acid** is a **bio-based building block** that can be employed as a more environmental friendly alternative to traditional herbicides in crop protection.

Our organic acids are being used in an innovative **biomimetic biocontrol** device developed by our partner **Cearitis**, as an alternative to insecticide.

The system, which is compatible with organic farming, lets farmers **protect their orchards safely and effectively**: AFYREN molecules are combined and used to act as a **repellent** to protect the trees, and a mechanical system is set up to attract and trap pests.

The **WWF's Living Planet Index**, which tracks populations of mammals, birds, fish, reptiles and amphibians - reveals an average 69% decrease in monitored wildlife populations since 1970.

Additionally, **AFYREN's VITAFYREN™** line offers bio-based organic acids that can be used to **produce functional ingredients for animal feed**. These products **help maintain gut balance for animals**, **reduce the prevalence of harmful bacteria**, and **help fight against antimicrobial resistance** as **alternatives to antibiotics**.

Transforming our food system is undoubtedly a **complex endeavor**, marked by multiple challenges. But the wheels have been set in motion. It's a journey fueled by **innovation**, **sustainability**, and a **growing consciousness** of how our choices can have **far-reaching impacts on our environment**.

By supporting initiatives and businesses that champion **circularity** and embrace **eco-friendly solutions**, we can **contribute to crafting a more sustainable, fair, and Earth-friendly food system**.

We stand at a crossroads, faced with the option of adhering to an inefficient and damaging status quo or leaping forward to reshape agriculture on a global scale.

FOOD FIGURES FOR THOUGHT

There are **8 billion people** on Earth who need **to be fed daily** according to the **United Nations.**

Global farming productivity is 21% lower than it could have been without climate change, according to **scientists**. Climate change has basically **wiped out about seven years of improvements in agricultural productivity** over the past 60 years.

17% of global food production goes to waste. If food waste were a country, it would be the **third-largest emitter**.

The food system is globally responsible for **31% of greenhouse gas emissions** and is the **primary driver of biodiversity loss**.

62% of consumers questioned said **they were paying more attention to ingredient lists** now than they did five years ago.

AFYREN'S biobased organic acids have a **carbon footprint 5 times lower than their petro-based equivalents**.

There is a **69% decrease in monitored wildlife** species population since **1970**.